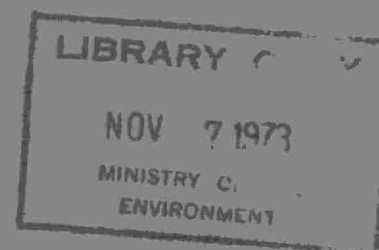


OPERATING SUMMARY



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WESTMINSTER TWP.

1972

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Ontario

Ministry of the
Environment

135 St. Clair Avenue West
Toronto 195, Ontario

We are pleased to present you with the 1972 operating summary for the water pollution control plant serving your community.

This summary contains data on the performance of the plant as well as relevant financial information. Of particular interest is the review of the year's activities in which significant items of these data are discussed in some detail by the operations engineer and his staff who, by their day-to-day involvement with the operation, are thoroughly familiar with the plant.

We appreciate your continuing interest in protecting the environment through the efficient operation of this wastewater treatment facility.

D.S. Caverly,
Assistant Deputy Minister.

D.A. McTavish, P. Eng.,
Director,
Project Operations Branch.

MINISTRY OF THE ENVIRONMENT

MINISTER
Honourable James A.C. Auld

DEPUTY MINISTER
E. Biggs

ASSISTANT DEPUTY MINISTER
D.S. Caverly

EXECUTIVE DIRECTOR
K. H. Sharpe

PROJECT OPERATIONS BRANCH

DIRECTOR
D. A. McTavish

ASSISTANT DIRECTOR
C. W. Perry

REGIONAL SUPERVISOR
P. J. Osmond

ENGINEER-MANAGER
E. A. N. Ladbrooke

135 St. Clair Avenue West
Toronto 195

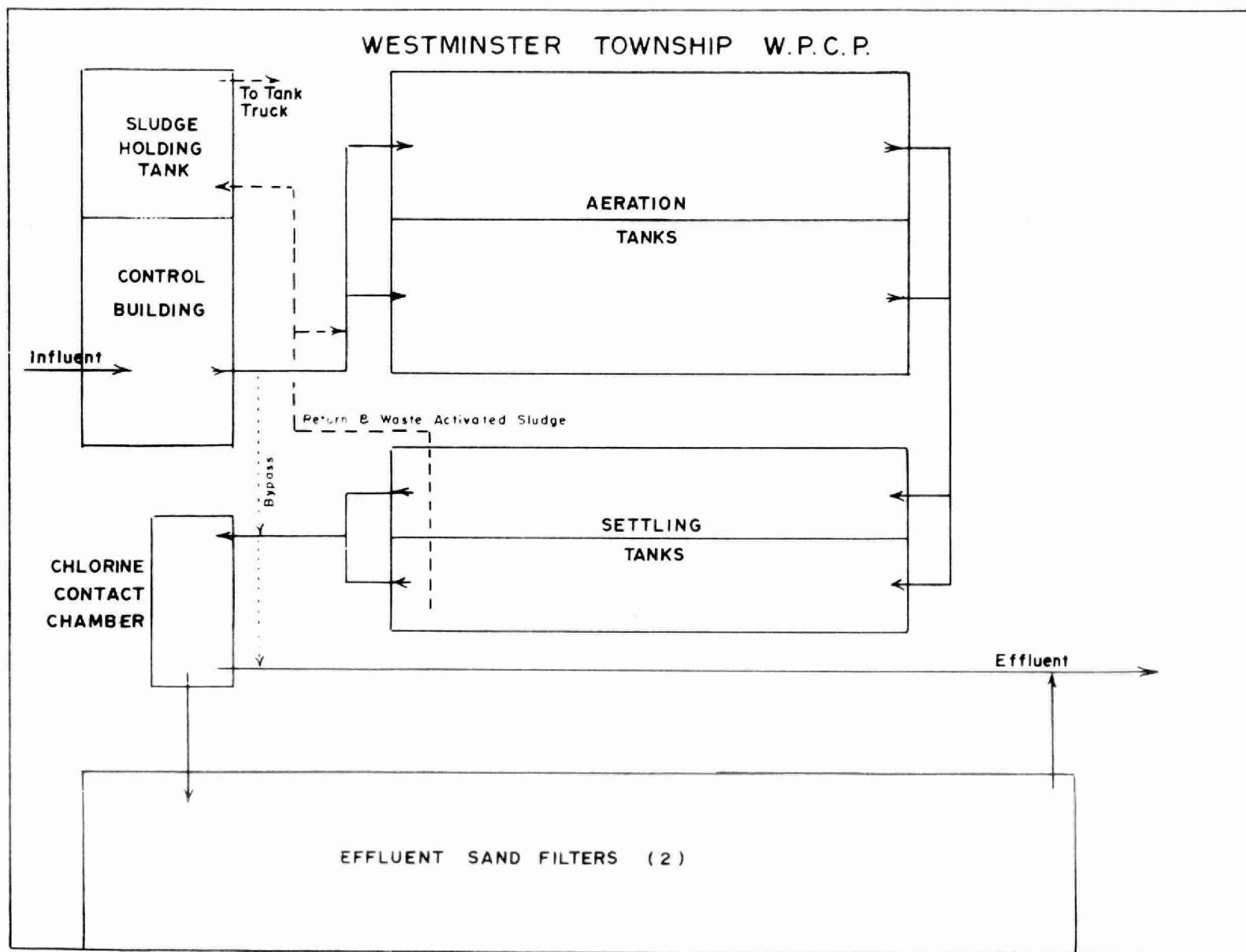
WESTMINSTER TWP.
WATER POLLUTION CONTROL PLANT

operated for
THE TOWNSHIP OF WESTMINSTER
by the
MINISTRY OF THE ENVIRONMENT

1972 ANNUAL OPERATING SUMMARY

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DESIGN DATA

PROJECT NO. 2-0033-59
TREATMENT Extended Aeration
DESIGN FLOW 0.25 mgd
DESIGN POPULATION 5,000

PRETREATMENT

Comminution

Type: Barminutor
Size: One Model B (12")
Chicago Pump Co.

RAW SEWAGE PUMPS

Make: Chicago Pump
#1 - 100 gpm @ 23' tdh
Type: 4x4, 2hp electric
#2 - 100 gpm @ 23' tdh
Type: 4x4, 2hp electric
with standby Wisconsin
THD size $3\frac{1}{4}$ x $3\frac{1}{4}$ gasoline engine
#3 - 250 gpm x 20' tdh
Type: LMC4, 3 hp electric

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air; single-pass
Size: Two 54' x 27' x 14' (252,000 gal)
Retention: 24.2 hr

Diffusers

- Discfusers on swing arm

Air Supply

Type: Sutorbilt
Size: Three 337 scfm @ 7 psi

Secondary Sedimentation

Type: Link-Belt
Size: Two 54' x 8' x 9.25' (50,200 gal)
Retention: 4.80 hr
Loading: Surface, 580 gal/ft²/day
Weir, 1955 gal/ft/day

CHLORINATION

Type: W & T
Size: One 100 lb/day

Chlorine Contact Chamber

Size: One 10' x 7' x 9' (3930 gal)
Retention: 22.7 min

OUTFALL

- to Dingman Creek

TERTIARY TREATMENT

Effluent Sand Filters

Size: Four units (26,900 sq ft or 0.62 acres)
Depth: 30" of sand (min)
Capacity: .405 mil gal/acre/day

SLUDGE HANDLING

Sludge Holding Tank

Size: 4,460 cu ft or 27,850 gal

'72 Review

GENERAL

This project consists of a 0.25 mgd total oxidation treatment plant with comminution, raw sewage pumping, diffused air aeration, final settling, chlorination, effluent sand beds, a sludge holding tank, liquid sludge disposal and approximately $1\frac{1}{2}$ miles of 21-inch diameter trunk sewer.

The plant chief operator was assisted by a casual operator two days a week throughout the year. A temporary mechanical handyman and a summer student were employed on a major mechanical overhaul programme. Shafts were rebuilt and machines, and new wearing rings and bearings were fitted in the three raw sewage pumps, the dewatering pump and the sludge return pump. New bearings were installed in two air blowers and all electric motors were cleaned and new bearings fitted. New chains and sprockets with rebuilt shafts were installed in one sedimentation tank sludge scraper mechanism. New working parts were installed in the chlorinator. The fences, guard rails and floors of the plant building were painted.

Four industrial acid waste dumps of a short duration were experienced in 1972. Storm runoff continued to cause high peak flows through the plant almost doubling the flow capacity. The storm flows contained high concentrations of clay and silt which coated the filter beds, reducing their filtering capacity. On these occasions, the plant effluent had to be diverted directly to the receiving stream.

EXPENDITURES

The operating cost for 1972 was \$29,017.32. The cost per million gallons treated was \$250.00.

PLANT FLOWS AND CHLORINATION

Plant flows during 1972 amounted to a total of 116.1 million gallons, an increase of 13.0 percent above 1971 flows. The design flow of .25 mgd was exceeded significantly during the months of January, March, April, May, November and December. Flows during the month of December averaged 420,000 gpd or 168 percent of design capacity.

A total of 1848 pounds of chlorine was used at an average dose of 3.5 mg/l during the period May through November. A residual of 0.5 mg/l in the effluent was maintained during the chlorination period.

PLANT EFFICIENCY

The average strength of the raw sewage during the year was 149 mg/l BOD and 174 mg/l suspended solids. Final effluent averaged 6 mg/l BOD and 7 mg/l suspended solids, indicating reductions of 96 percent respectively on average over the year. From the probability graphs, it can be seen that the effluent BOD met the Ministry's objective of 15 mg/l 84 percent of the time and suspended solids 87 percent of the time. The above results are based on composite samples taken every two weeks.

The plant operated at an average of 142 percent of its hydraulic design capacity during the high flow months mentioned. During the remainder of the year, flows were reduced to near design levels.

AERATION

The mixed liquor suspended solids averaged 4,835 mg/l during the year. The BOD loading per pound of MLSS was 0.04 pounds which was a decrease of 0.02 pounds.

EFFLUENT SAND FILTERS

The effluent sand filters were used all year except at night and weekends in November and December when ponding due to silt plugging and freezing could not be observed by the operating staff. The sand filter effluent BOD averaged 6 mg/l and the suspended solids averaged 7 mg/l.

PHOSPHORUS REMOVAL

Laboratory testing was carried out to determine the process most compatible with existing sewage characteristics and treatment methods, to economically reduce effluent phosphorus levels to 1.0 mg/l, with the objective date of December 31, 1973 for the operation of permanently installed equipment, as required by Provincial regulations. Alum and ferric chloride appeared to be equally effective. It was estimated that a dose of 18 mg/l of iron in ferric chloride would be cheaper at \$30 per million gallons of sewage. Arrangements were made for plant scale tests to be carried on early in 1973, under the direction of a consulting engineer. The cost of the study and any temporary equipment necessary for the work will not be borne by the Municipality.

CONCLUSIONS

The plant flows were near design capacity during the summer and early fall months only. By careful operation of the plant, the effluent BOD and suspended solids levels met Ministry standards for discharge to receiving streams.

Research on the removal of phosphorus from the plant effluent will continue, with the objective of having permanent phosphorus equipment installed and ready for operation on December 31, 1973.

PROJECT COSTS

NET CAPITAL COST	\$270, 727. 24
DEDUCT - Portion financed by	
MUNICIPAL ADVANCES	<u>(65, 773. 40)</u>
Long Term Debt to MOE	<u>\$204, 953. 84</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1972	<u>\$154, 363. 67</u>
Net Operating	\$ 28, 902. 07
Debt Retirement	17, 673. 00
Reserve	-
Interest Charged	<u>11, 493. 60</u>
TOTAL	<u>\$ 58, 068. 67</u>

RESERVE ACCOUNT

Balance @ January 1, 1972	\$ 22, 217. 47
Deposited by Municipality	-
Interest Earned	<u>1, 457. 08</u>
	\$ 23, 674. 55
Less Expenditures	<u>-</u>
Balance @ December 31, 1972	<u>\$ 23, 674. 55</u>

OPERATING COSTS

• PAYROLL	58 %
• FUEL	NIL %
• POWER	9 %
• CHEMICALS	1 %
• GENERAL SUPPLIES	4 %
• EQUIPMENT	6 %
• REPAIRS & MAINTENANCE	13 %
• SUNDRY	6 %
• WATER	NIL %
• TRAVEL	3 %

1972 COSTS

TOTAL ANNUAL COST

NET OPERATING	50 %
DEBT RETIREMENT	30 %
RESERVE	NIL %
INTEREST	20 %

YEARLY OPERATING COSTS

YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	TREATMENT COSTS	
			\$ per million gal	£ per lb BOD
1968	75.92	15,471.07	203.78	11 cents
1969	126.45	17,264.18	136.53	16 cents
1970	146.42	24,170.67	165.08	18 cents
1971	103.0	18,607.78	179.79	15 cents
1972	116.1	29,017.32	246.10	18 cents

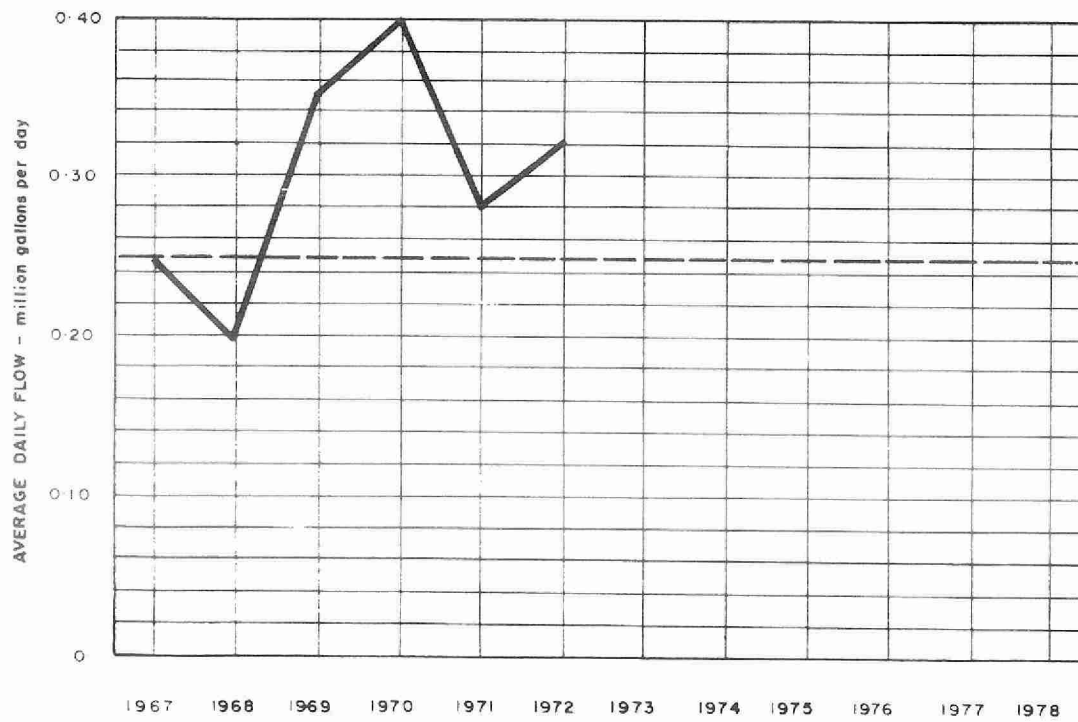
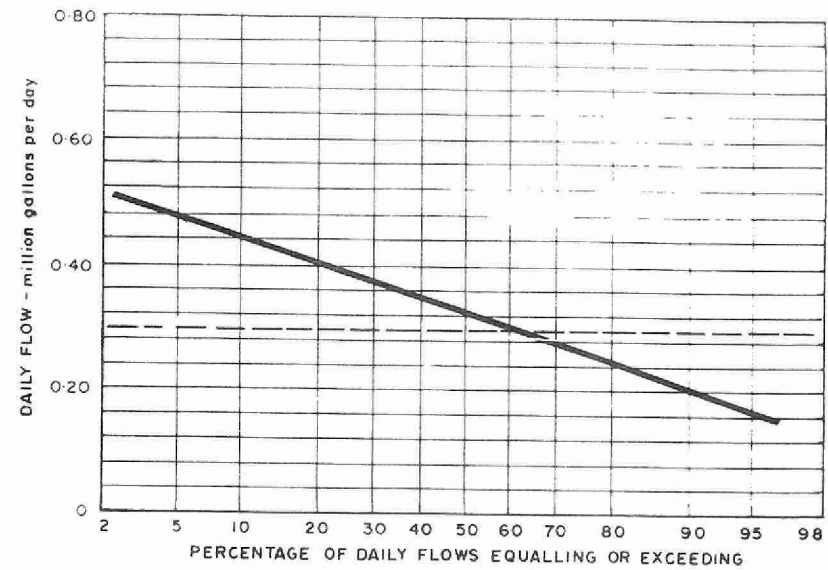
MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	REGULAR PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY*	WATER	TRAVEL
JAN	1295.02	820.45	258.24		216.33							
FEB	1553.47	752.62	216.56		218.48		170.89		125.05	17.52		52.35
MAR	1421.22	756.80	209.19		233.28				108.95	59.15		53.85
APR	1878.42	706.40	450.97		217.18		105.73	219.51	97.56	33.22		47.85
MAY	2049.99	1124.00	356.76		207.83		91.07		198.32	25.81		46.20
JUNE	3873.86	1161.94	639.38		237.58	261.00	754.81		427.10	392.05		
JULY	714.53	2.56			213.18		155.24		153.45	50.00		140.10
AUG	3091.52	834.60	1209.45				114.85		417.18	327.94		187.50
SEPT	3190.97	723.38	950.43		422.76		(497.56)		1332.08	56.63		203.25
OCT	3540.78	1123.13	405.77		196.38		106.35	1602.96	64.80	41.39		
NOV	281.68	2.50							36.50	204.07		38.61
DEC	6125.86	1809.19	1525.32		468.41		95.64		771.00	387.30		69.00
TOTAL	29017.32	10817.57	6222.07		2631.41	261.00	1097.02	1822.47	3731.99	1595.08		838.71

Brackets indicate credit.

* Sundry includes sludge haulage costs of \$660.00

PROCESS DATA FLOWS

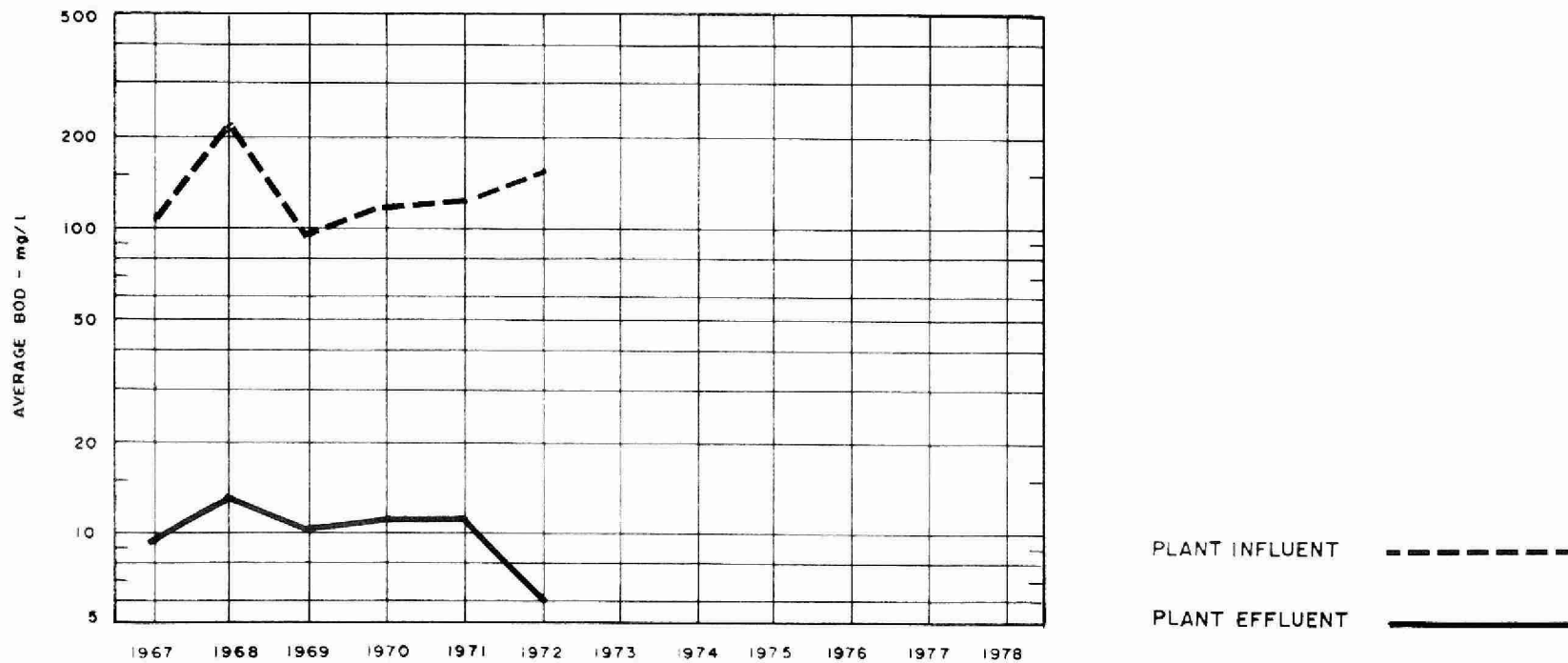
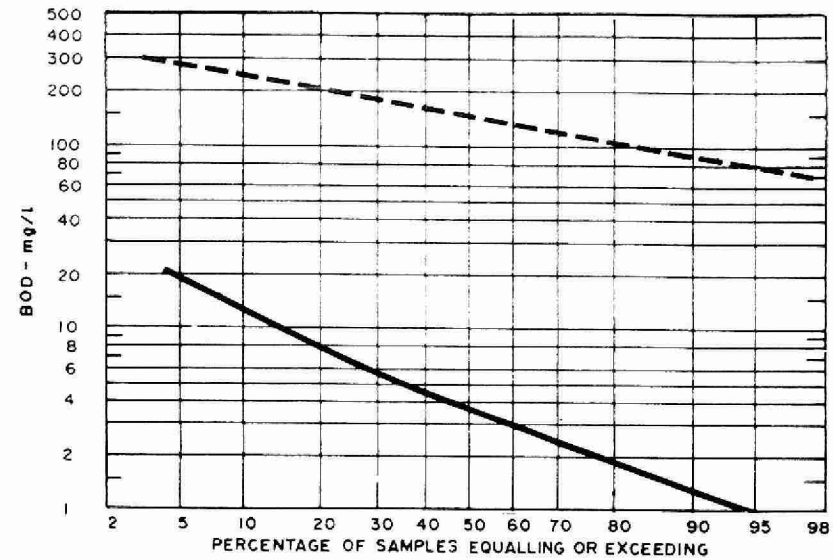


DESIGN CAPACITY — — — — —

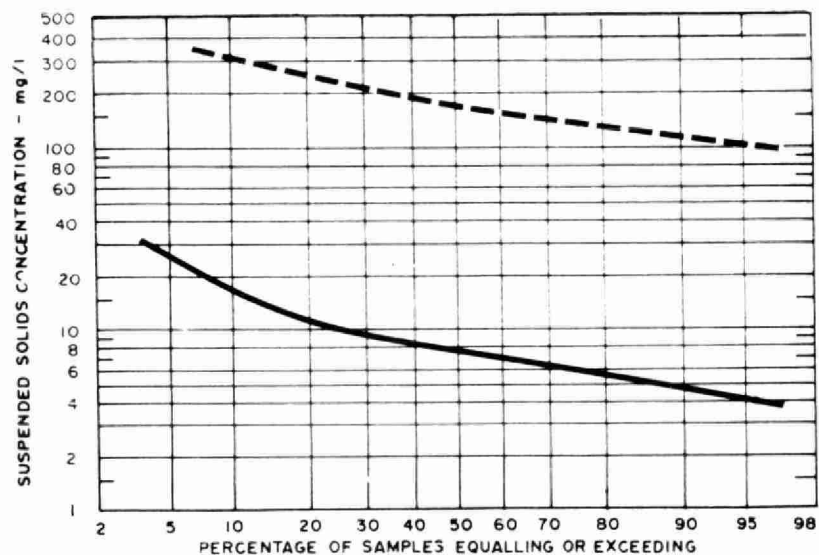
PLANT PERFORMANCE

MONTH	FLOWS			BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				PHOSPHORUS	
	TOTAL FLOW	AVERAGE DAY	MAXIMUM DAY	INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT
	million gallons	mil. gal	mgd	mg/l	mg/l	%	10 ³ pounds	mg/l	mg/l	%	10 ³ pounds	mg/l P	mg/l P
JAN	11.3	.36	.49	100	15	85	10	125	28	78	11	6.1	3.0
FEB	7.8	.27	.38	145	10	93	10	235	8	97	18	7.3	2.0
MAR	11.6	.37	.58	133	5	96	15	157	5	97	17	9.3	1.8
APR	10.7	.36	.60	75	5	93	7	170	5	97	18	4.8	1.7
MAY	12.2	.39	.57	153	13	92	17	136	8	94	16	6.2	2.4
JUNE	6.7	.22	.42	220	6	97	14	125	5	96	8	7.0	2.6
JULY	8.6	.28	.48	140	3	98	12	300	7	98	25	7.4	2.5
AUG	8.7	.28	.49	130	3	98	11	185	5	97	16	6.5	3.4
SEPT	6.8	.23	.40	190	4	98	13	185	5	97	12	9.1	2.8
OCT	8.8	.29	.49	215	4	98	19	255	5	98	22	9.4	2.8
NOV	9.8	.33	.47	147	1	99	14	123	3	98	12	6.4	1.7
DEC	13.1	.42	.60	108	2	98	14	140	5	96	18	5.9	2.1
TOTAL	116.1	-	-	-	-	-	156	-	-	-	193	-	-
AVG.		.32	MAXIMUM .60	149	6	96	13	174	7	96	16	7.2	2.4
No. of Samples	-	-	-	26	26	-	-	26	26	-	-	26	26

BIOCHEMICAL OXYGEN DEMAND

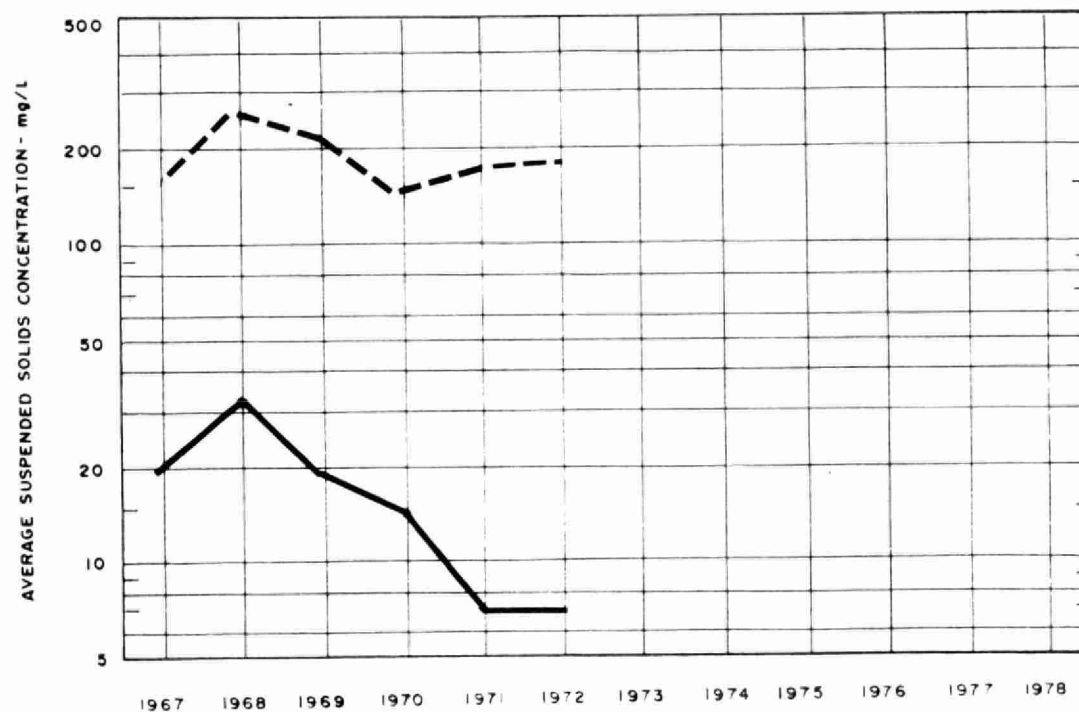


SUSPENDED SOLIDS

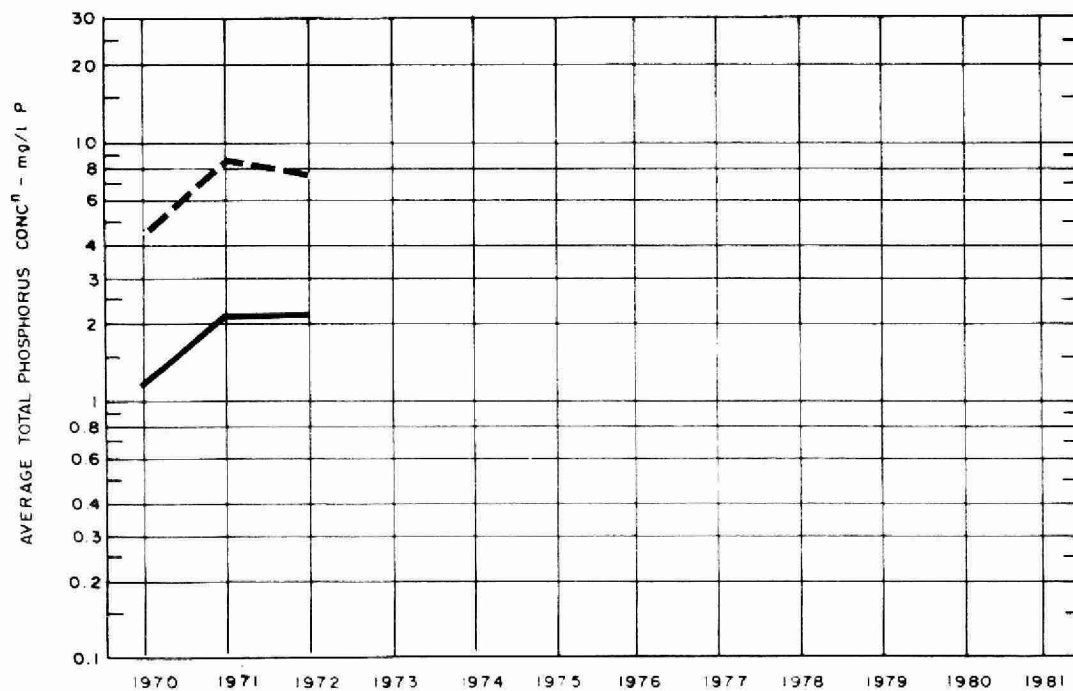
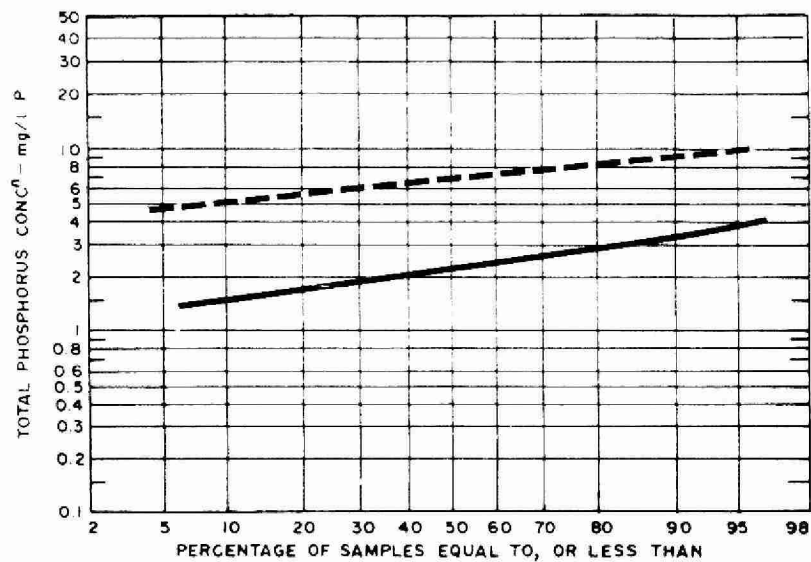


PLANT INFLUENT - - - - -

PLANT EFFLUENT —————



PHOSPHORUS



PLANT INFLUENT -----

PLANT EFFLUENT _____

TREATMENT DATA

MONTH	GRIT	CHLORINATION		AERATION			WASTE SLUDGE			AEROBIC DIGESTER			
	QUANTITY REMOVED	CL ₂ USED	AVG DOSAGE	MLSS CONC	F/M	AIR USED	QUANTITY	SUSPENDED SOLIDS	VOL SOLIDS	QUANTITY REMOVED	SUSPENDED SOLIDS	VOL SOLIDS	AMOUNT HAULED
	cubic feet	pounds	mg/l	mg/l	day ⁻¹	$\frac{1000 \text{ ft}}{\text{lb BOD}}$	10^3 gallons	mg/l	%	10 gallons	mg/l	%	cubic yards
JAN				6200	.02	1.7	16	14950	64				
FEB				6250	.02	1.6	24	14880	63				
MAR				4290	.05	1.1	2	14530	64				
APR				4650	.02	2.0	10	19600	63				
MAY		156 *	2.6	4760	.05	1.5	14	16480	63				
JUNE		291	4.3	4605	.04	1.5		15175	63				
JULY		267	3.1	6660	.02	2.3	22	16170	65				
AUG		317	3.6	4920	.03	2.9	14	11990	60				
SEPT		328	4.8	3350	.07	2.4	8	5330	61				
OCT		279	3.2	4060	.06	1.7	30	9730	67				
NOV		210 *	3.0	4450	.04	2.1	30	12910	62				
DEC				3820	.05	2.3	18	16180	68				
TOTAL		1848	-	-	-	-	188	-	-		-	-	
AVG.	cu. ft/mil gal	264		4835	.04	1.9	16	13994	64				

* Started chlorine May 16th

* Stopped chlorine November 22nd

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